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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Hideyuki KIMURA et al.

Group Art Unit: 1772

Application No.: 09/674,077

Examiner: M. Patterson

Filed: October 26, 2000

Docket No.: 107714

For: INSERT-BONDED CYLINDRICAL ARTICLES, AND A MOLDING METHOD AND A MOLDING APPARATUS THEREFORE TECHNICAL FIELD TO WHICH THE INVENTION PERTAINS

CONFIRMATION OF TELEPHONE CONFERENCE AND RESUBMISSION OF APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

As discussed during an August 3 telephone conference with Examiner Patterson, the Patent Office does not have a record of the Appeal Brief submitted March 1, 2005. To ensure consideration, Applicants resubmit the same with the Patent Office's date-stamped receipt as evidence of the earlier submission. Because the Appeal Brief was timely filed, no fees are believe to be due

Prompt entry and consideration of the Appeal Brief is respectfully requested.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Robert A. Miller
Registration No. 32,771

JAO:RAM/tls

Date: August 3, 2005

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Name of Applicant: Hideyuki KIMURA et al.

Serial No.: 09/674,077

Atty. File No.: 107714

Title (New Cases):

Sender's Initials: JAO:KXH/mdw

PATENT OFFICE DATE STAMP

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**Oliff & Berridge, PLC
277 S. Washington Street, Suite 500, Alexandria, Virginia 22314**

PATENT APPLICATION

PATENT AND TRADEMARK OFFICE

BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Hideyuki KIMURA et al.

On Appeal from Group: 1772

Application No.: 09/674,077

Examiner: M. Patterson

Filed: October 26, 2000

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For: INSERTED-BONDED CYLINDRICAL ARTICLES, AND A MOLDING METHOD AND A MOLDING APPARATUS THEREFOR TECHNICAL FIELD TO WHICH THE INVENTION PERTAINS

APPEAL BRIEF TRANSMITTAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached hereto is our Brief on Appeal in the above-identified application.

Also attached hereto is our Check No. 164092 in the amount of Five Hundred Dollars ($500.00) in payment of the Brief fee under 37 C.F.R. 1.17(c). In the event of any underpayment or overpayment, please debit or credit our Deposit Account No. 15-0461 as needed in order to effect proper filing of this Brief.

For the convenience of the Finance Division, two additional copies of this transmittal letter are attached.

Respectfully submitted,

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Date: March 1, 2005

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James A. Oliff

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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Hideyuki KIMURA et al.

Group Art Unit: 1772

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Filed: October 26, 2000

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For: INSERTED-BONDED CYLINDRICAL ARTICLES, AND A MOLDING METHOD AND A MOLDING APPARATUS THEREFOR TECHNICAL FIELD TO WHICH THE INVENTION PERTAINS

BRIEF ON APPEAL

Appeal from Group 1772

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TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

The real party in interest for this appeal and the present application is Yoshino Kogyosho Co., Ltd., by way of an Assignment recorded in the U.S. Patent and Trademark Office at Reel 011423, Frame 0481.

II. STATEMENT OF RELATED APPEALS AND INTERFERENCES

There are no prior or pending appeals, interferences or judicial proceedings, known to Appellant, Appellant's representative, or the Assignee, that may be related to, or which will directly affect or be directly affected by or have a bearing upon the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-6, 12-14 and 21-23 stand rejected and are on appeal.

Claims 1-6, 12-14 and 21-23 are pending, with claims 7-11 and 15-20 being previously cancelled.

No claims are allowed.

IV. STATUS OF AMENDMENTS

A Final Rejection was issued on October 1, 2004. A Request for Reconsideration, without amendments, was filed on December 3, 2004. Thus, there have been no amendments for entry upon the filing of this appeal.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The invention relates to insert-bonded cylindrical article that includes a cylindrical molded body made from a synthetic resin with a sheet-shaped insert integrally bonded to an outer peripheral surface of the cylindrical molded body and molding method (page 1, lines 6-9).

The invention is to provide an insertion-molded cylindrical article and a method for making the same that prevents the molten resin from entering between the surface of a sheet-shaped insert, such as a label, and the surface of an outer mold unit, as well as preventing the insert from being deviated from a predetermined position at the inner surface of the outer mold unit or from being wrinkled by pushing down the insert with the molten resin, when the insert is bonded to the molten resin by insert molding (page 4, lines 8-17).

The insertion-molded cylindrical article includes a cylindrical molded body 10 having an inner surface, a mark 10b of an injection gate opening 19a positioned on the inner surface, and a barrel portion having an outer surface, and a sheet-shaped insert 32 having an upper end. The insert 32 is bonded to the outer surface of the barrel portion, and the mark 10b is positioned at the inner surface of the cylindrical molded body 10 while being inwardly apart from the upper end of the insert 32 in an axial direction and at a position corresponding to a position on the inner surface that is covered by the insert 32 (Figs. 5 and 7, and page 17, lines 9-25). (Claim 1)

The mark 10b may be positioned only at the inner surface of the cylindrical molded body 10 while being inwardly apart from the upper end of the insert 32 in the axial direction and only at a position corresponding to a position on the inner surface that is covered by the insert 32. (Claim 22)

For making the insertion-molded cylindrical article 10 using an insertion injection molding mold, the insertion injection molding mold includes an outer mold unit 1 having an

inner surface and a pull-out mold unit (end disc 11), mouth-molding mold unit 12, barrel-portion molding unit 13, and stopper mold unit 14) and defining a core-inserting space therein, a core 2, 16 having an injection gate opening 19a and shaped to be inserted and fitted into the outer molding unit 1, and a molding cavity 17 defined between said outer mold unit 1 and the core 16 inside the injection molding mold (Fig. 2, page 12, line 18-page 13, line 3). The method for making such an insertion-molded cylindrical article 10 includes fitting, attaching and holding the insert 32 along the inner surface of the outer molding unit 1 in the molding cavity 17 (page 14, line 26-page 15, line 6), injecting a molten resin through the injection gate opening 19a toward the molded body inner surface at a position inwardly apart from the upper end of the insert 32 in an axial direction and at a position corresponding to a position on the molded body inner surface that is covered by the insert 32 (Fig. 5 and page 16, lines 4-11), and curing and forming the cylindrical molded body 10 while pushing the insert 32 onto the inner surface of the outer molding unit with the molten resin (page 16, lines 12-18). The insert is integrally bonded to the outer surface of the barrel portion of the cylindrical molded body 10 (page 16, lines 19-20). (Claim 3)

The molten resin may be injected through the injection gate opening 19a toward the molded body inner surface only at a position inwardly apart from the upper end of the insert 32 in the axial direction and only at a position corresponding to a position on the molded body inner surface that is covered by the insert 32. (Claim 23)

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The following grounds of rejection are presented for review:

1) Claims 1-2 and 21-22 are rejected under 35 U.S.C. §103(a) over Japanese Patent Application Laid-Open No. 6246777 to Suzuki et al. (Suzuki).

2) Claims 3-6, 12-14 and 23 are rejected under 35 U.S.C. §103(a) over Suzuki in view of Japanese Patent Application Laid-Open No. 03286815 assigned to Asahi Chemical Industry Co., Ltd. (Asahi Chemical).

VII. ARGUMENT

The Examiner rejects claims 1-2 and 21-22 under 35 U.S.C. §103(a) over Suzuki and claims 3-6, 12-14 and 23 under 35 U.S.C. §103(a) over Suzuki in view of Asahi Chemical. However, the Examiner has improperly applied the law relating to obviousness. Proper application of the law demonstrates that no *prima facie* case of obviousness has been shown, and that the claimed invention would not have been obvious over the applied references.

A. Factual Inquiries to Determine Obviousness/Non-Obviousness

Several basic factual inquiries must be made in order to determine obviousness or non-obviousness of claims of a patent application under 35 U.S.C. §103. These factual inquiries are set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966):

> Under §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or non-obviousness of the subject matter is determined.

As stated by the Federal Circuit in In re Ochiai, 37 USPQ2d 1127, 1131 (Fed. Cir. 1995):

> [t]he test of obviousness *vel non* is statutory. It requires that one compare the claim's subject matter as a whole with the prior art to which the subject matter pertains. 35 U.S.C. §103.
>
> The inquiry is thus highly fact-specific by design ... when the references cited by the Examiner fail to establish a *prima facie* case of obviousness, the rejection is improper and will be overturned. In re Fine, 837 F.2d 1071, 1074; 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). (Emphasis added.)

In rejecting claims under 35 U.S.C. §103(a), an Examiner bears an initial burden of presenting a *prima facie* case of obviousness. A *prima facie* case of obviousness is established only if the teaching of the prior art would have suggested the claimed subject matter to a person of ordinary skill in the art. If an Examiner fails to establish a *prima facie* case, the rejection is improper and will be overturned. See In re Rijckaert, 9F.3d 1531; 28 USPQ2d 1955 (Fed Cir. 1993). "If examination ... does not produce a *prima facie* case of unpatentability, then without

more the Applicant is entitled to the grant of the patent." In re Oetiker, 977 F.2d 1443, 1445-1446; 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

The specific factual inquiries set forth in Graham have not been considered or properly applied by the Examiner in formulating the rejection of the subject claims. Particularly, the scope and content of the prior art and differences between the prior art and the claims are not properly determined and demonstrated and applied to the claimed invention.

In the present case, proper consideration of the factual inquiries demonstrates nonobviousness of the claimed invention. The cited references do not teach or suggest the claimed inventions, nor do the cited references teach or suggest any advantages that would be provided thereby. Thus, the claims are not given fair and proper consideration.

Further, the Examiner improperly relies on hindsight knowledge gained from Applicants' disclosure to reach the obviousness determination using the prior art. "To imbue one of ordinary skill in the art with knowledge of the invention, where no prior art reference or references of record convey or suggest that knowledge, is to fall victim of the insidious affect of hindsight syndrome wherein that which only the inventor taught is used against a teacher." See W.L. Gore and Assic. v. Garlock, Inc., 721 f.2d 1540, 1543, 220 USPQ 303, 312-13 (Fed. Cir. 1983).

B. Claims 1-2 and 21-22 Would Not Have Been Obvious Over Suzuki

Claims 1-2 and 21-22 are rejected under 35 U.S.C. §103(a) over Suzuki (attached is a manually translated version of the Suzuki reference to assist the Patent Office's understanding of the reference). On the basis of the machine translation of the Suzuki reference, the Examiner admits that Suzuki fails to disclose each and every claimed feature but asserts that missing features are obvious from its teaching.

1. Claims 1-2 and 21

Independent claim 1 is directed to an insertion-molded cylindrical article. Claims 2 and 21 ultimately depend from claim 1. Claim 1 specifies that the insertion-molded cylindrical article includes a cylindrical molded body having an inner surface, a mark of an injection gate opening positioned on the inner surface, and a barrel portion having an outer surface, and a sheet-shaped insert having an upper end. The insert is bonded to the outer surface of the barrel portion, and the mark is positioned at the inner surface of the cylindrical molded body while being inwardly apart from the upper end of the insert in an axial direction and at a position corresponding to a position on the inner surface that is covered by the insert. Such an insertion-molded cylindrical article is nowhere taught or suggested by the cited reference.

In contrast to the claimed invention, Suzuki relates to manufacturing a compound container by integrating a thermoplastic resin injected with a blank board using a split mold. As described in paragraph [0018], of Suzuki, and shown in Fig. 4, a blank board 103, pre-curved by winding around a core 31, is placed at a predetermined position in a cavity 51. Then, as shown in Fig. 5, a molten thermoplastic resin is injected in the cavity 51 through runners 32 from an injection gate 41. As a result, a pillar part 102a, a flange 102b, a shoulder 102c, and a screw thread opening 102d are formed. At this time, the blank board 103 held cylindrically is integrated by fusion with the thermoplastic resin structuring the pillar part 102a, the flange 102b and the shoulder 102c at ends 103a, the lower opening end 103b and the upper opening end 103c. That is, the blank board 103 is welded to the resin at its edges as described in the machine translation of paragraph [0018].

As described in paragraph [0011], two or more the runners 32 that are connected to the injection gate 41 and the cavity 51 are drilled in the upper part of the core 31. In fact, the machine translation indicates this is a unique part of the core 31 calling it an "abbreviation"

core. As discussed in paragraph [0005], conventionally there are problems that, for compound containers having a screw thread opening, such as a part that protrudes outside of the container, interferes when removing the thermoplastic resin integrated with a blank board from the mold. Therefore, as shown in Fig. 8 and described in paragraph [0021], by providing runners 32 in the upper part of the core 31, the cured thermoplastic resin 61 can be easily removed from the screw thread opening 102d by pushing a pin 33 upwardly.

The Examiner has not established a *prima facie* case of obviousness of the claimed invention based on Suzuki. The requirements for a *prima facie* case of obviousness are specified and described in MPEP §2143. According to MPEP §2143, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation to modify the reference. Second, there must be a reasonable expectation of success. Third, the prior art references must teach or suggest all the claim limitations. The reference applied in the Office Action fails to teach or suggest all the claim limitations fails to provide any reasonable expectation of success, and there is no motivation to modify the reference as suggested in the Office Action as the only resin is at the edges of the blank board 103 so there is no place to inject at a position covered by the insert.

a. Suzuki does not teach or suggest the mark being positioned at the inner surface of the cylindrical molded body while being inwardly apart from the upper end of the insert in an axial direction and at a position corresponding to a position on the inner surface that is covered by the insert

According to the claimed invention, the mark of the injection gate opening is positioned at the inner surface of the cylindrical molded body while being inwardly apart from the upper end of the insert in an axial direction and at a position corresponding to a position on the inner surface that is covered by the insert. That is, as shown in Applicants' Fig. 7, the mark is made by providing the injection gate opening 19a of the molding mold in the cylindrical article-molding portion at the position inwardly spaced from the upper end of the

insert 32 and at a position corresponding to a position on the inner surface that is covered by the insert 32. The molten resin is injected into the cavity through the gate opening 19a. By so doing, the insert is pushed and closely fitted to the inner surface of the outer mold unit by the pressure of the resin. Therefore, the molten resin is prevented from going onto the surface of the label (page 7, lines 9-25).

As discussed above, in Suzuki, the runners 32 are provided at the screw thread opening 102d. Thus, as admitted by the Office Action, Suzuki does not disclose that the mark is positioned at the inner surface of the cylindrical molded body while being inwardly apart from the upper end of the insert in an axial direction and at a position corresponding to a position on the inner surface that is covered by the insert.

b. The Examiner relies on impermissible hindsight knowledge gained from Applicants' disclosure

The Office Action then asserts that it would have been obvious to provide additional runners at different locations along the cavity, depending on the desired number of connection points, by relying on Suzuki's disclosure at paragraph [0011] that "two or more runners can be drilled in the upper part of the core" (emphasis added). But the portion of the core 31 addressed is a special part further designated as the "abbreviation" core.

As asserted in the July 21, 2004 Amendment and the December 3, 2004 Request for Reconsideration, although Suzuki very briefly mentions using two or more runners, Suzuki is silent regarding any position of the runners other than at a top position. That is, Suzuki only mentions runners in the top portion or "abbreviation" core, of the core 31. Suzuki specifically teaches that the runners are drilled in the upper part of the core.

The Office Action merely states that one of ordinary skill in the art would recognize the utility of providing for additional runners which connect the injection gate with the cavity at locations which include locations which are covered by the insert, and are at positions

inwardly apart from the upper end of the insert, depending on the desired number of connection points between the injection gate and the cavity, but does not provide any motivation, such as specific advantages, to provide the runners at different locations, specifically at the inner surface of the cylindrical molded body while being inwardly apart from the upper end of the bland plate 103 in an axial direction and at a position corresponding to a position on the inner surface that is covered by the blank board 103. As the body of the Suzuki container is a blank board 103 and the only resin in the body portion is pillar 102a what motivates one to place a runner where no resin exists.

Furthermore, in the December 23, 2004 Advisory Action, the Examiner alleges that the resin is in contact with the blank board at position 103c, and the resin also therefore forms part of the sidewall of the container. 103c is defined as an upper open end of the blank board 103 by Suzuki and is attached (welded) to a shoulder 102c of the resin top of the container.

Then the Advisory Action states, at page 3, that because Suzuki discloses the use of additional runners, and because the additional runner cannot be in exactly the same location, no motivation is required to provide for additional runners at additional positions, without consideration of the fact that Suzuki teaches in paragraph [0011] that the runners 32 are drilled in the "upper part" of a core 31. The "upper part" in the context is clearly shown in Figs. 7 and 5 and referred to as the "abbreviation" core.

Moreover, the Examiner alleges that because Suzuki discloses molded resin in contact with an insert, motivation clearly exists to inject resin at a position that is in contact with the insert. However, this statement is merely an end result, and the Examiner does not explain why one of ordinary skill in the art would have been motivated to inject the resin at the position that is in contact with the insert. Further, the blank board 103 is not an insert, rather it is the body made of various layers of preformed materials (paragraph [0015]) that only has

resin parts "welded" at the edges. In other words, the Examiner fails to explain why one of ordinary skill in the art would have been motivated to position the runners 32 at the very narrow strips where the resin is welded to the blank board 103.

Because only Applicants' disclosure teaches such a feature and structure, such assertions have to rely on hindsight knowledge gained from Applicants' disclosure, and such an assertion based on hindsight knowledge is improper.

Moreover, even if the runners 32 were provided at strips welded with the insert (blank board or body of the container), it would be considered, with a reasonable understanding of the references, as the top of the alleged insert (actually the body), and therefore, it would not be "inwardly away from the upper end of the insert in an axial direction."

2. Claim 22

Claim 22 depends from claim 1 and recites that the mark is positioned only at the inner surface of the cylindrical molded body while being inwardly apart from the upper end of the insert in the axial direction and only at a position corresponding to a position on the inner surface that is covered by the insert. However, as discussed above, Suzuki does not teach or suggest this feature.

C. Claims 3-6, 12-14 and 23 Would Not Have Been Obvious Over Suzuki In View of Asahi Chemical

Claims 3-6, 12-14 and 23 are rejected under 35 U.S.C. §103(a) over Suzuki in view of Asahi Chemical. Asahi Chemical is relied only on teaching of curing a molten resin, which the Office Action admits that Suzuki lacks.

1. Claims 3-6 and 12-14

Independent claim 3 is directed to a method for making an insertion-molded cylindrical article. Claims 4, 5 and 12 ultimately depend from claim 3. Claim 3 specifies that the method for making the insertion-molded cylindrical article 10 using an insertion injection molding mold includes fitting, attaching and holding the insert along the inner

surface of the outer molding unit in the molding cavity, injecting a molten resin through the injection gate opening toward the molded body inner surface at a position inwardly apart from said upper end of the insert in an axial direction and at a position corresponding to a position on the molded body inner surface that is covered by the insert, and curing and forming the cylindrical molded body while pushing the insert onto the inner surface of the outer molding unit with the molten resin. The insert is integrally bonded to the outer surface of the barrel portion of the cylindrical molded body.

Asahi Chemical discloses an injection-molded object having a thickened section structure formed with a resin, such as a thermoplastic resin to improve appearance.

The Examiner has not established a *prima facie* case of obviousness of the claimed invention based on Suzuki as discussed above with respect to the article of claim 1. The references applied in the Office Action fail to teach or suggest all the claim limitations.

a. Suzuki does not teach or suggest injecting a molten resin through the injection gate opening toward the molded body inner surface at a position inwardly apart from said upper end of the insert in an axial direction and at a position corresponding to a position on the molded body inner surface that is covered by the insert

Similar to the above discussion in connection with claim 1, Suzuki does not teach or suggest these features. Specifically, Suzuki does not teach or suggest that a molten resin is injected through the injection gate opening toward the molded body inner surface at a position inwardly apart from said upper end of the insert in an axial direction and at a position corresponding to a position on the molded body inner surface that is covered by the insert.

Asahi Chemical is relied only on its teaching of curing thermoplastic resin and does not teach or suggest this feature. Therefore, Asahi Chemical does not overcome the deficiency, and thus, Suzuki and Asahi Chemical do not achieve the claimed invention.

b. The motivation for combination is improper

The Office Action relies on Asahi Chemical for curing the thermoplastic resin, which Suzuki allegedly lacks and states that the motivation for combining Suzuki and Asahi Chemical is to make a container having a good appearance as taught by Asahi Chemical. However, it is obvious that Suzuki teaches curing the thermoplastic resin because Suzuki teaches in Fig. 9 and paragraph [0022] that a fabricated compound container is taken out from the core 31. Therefore, one of ordinary skill in the art would not have been motivated to combine Asahi Chemical with Suzuki for a teaching already disclosed by Suzuki.

2. Claim 23

Claim 23 depends from claim 1 and recites that the molten resin is injected through the injection gate opening toward the molded body inner surface only at a position inwardly apart from the upper end of the insert in the axial direction and only at a position corresponding to a position on the molded body inner surface that is covered by the insert. However, as discussed above, the applied prior art does not teach or suggest this feature.

VIII. CONCLUSION

For all of the reasons discussed above, it is respectfully submitted that the rejections are in error and that claims 1-6, 12-14 and 21-23 are in condition for allowance. For all of the above reasons, Appellants respectfully request this Honorable Board to reverse the rejections of claims 1-6, 12-14 and 21-23.

Respectfully submitted,

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Filed: March 1, 2005

CLAIMS APPENDIX

CLAIMS INVOLVED IN THE APPEAL:

1. An insertion-molded cylindrical article, comprising

a cylindrical molded body having an inner surface, a mark of an injection gate opening positioned on said inner surface, and a barrel portion having an outer surface, and

a sheet-shaped insert having an upper end;

wherein said insert is bonded to said outer surface of said barrel portion, and

wherein said mark is positioned at said inner surface of the cylindrical molded body while being inwardly apart from said upper end of said insert in an axial direction and at a position corresponding to a position on said inner surface that is covered by said insert.

2. The insertion-molded cylindrical article set forth in claim 1, further comprising a gap on said outer surface positioned between opposed ends of said insert and not covered by said insert,

wherein said mark of the injection gate opening is not located in said gap.

3. A method for making an insertion-molded cylindrical article using an insertion injection molding mold,

said insertion-molded article comprising a cylindrical molded body having a molded body inner surface, a bottom portion, a barrel portion having an outer surface, and an insert having an upper end;

said insertion injection molding mold comprising an outer mold unit having an inner surface and a pull-out mold unit and defining a core-inserting space therein, a core having and injection gate opening and shaped to be inserted and fitted into the outer molding unit, and a molding cavity defined between said outer mold unit and said core inside the injection molding mold,

said method comprising

fitting, attaching and holding said insert along said inner surface of the outer molding unit in said molding cavity,

injecting a molten resin through said injection gate opening toward said molded body inner surface at a position inwardly apart from said upper end of the insert in an axial direction and at a position corresponding to a position on said molded body inner surface that is covered by said insert, and

curing and forming the cylindrical molded body while pushing the insert onto the inner surface of the outer molding unit with the molten resin;

wherein said insert is integrally bonded to said outer surface of said barrel portion of the cylindrical molded body.

4. The method set forth in claim 3, wherein said insertion-molded article further comprises a gap on said outer surface of said barrel portion positioned between opposed ends of said insert and not covered by said insert;

wherein the insert is fitted, attached and held along said inner surface of the molding cavity, and

wherein the molten resin is not injected toward said gap.

5. The method set forth in claim 3, wherein a knock-out pin is provided in the core, said method further comprising:

upwardly pulling out the pull-out mold unit of the outer mold unit after the insertion molding,

cutting a connection between the cured resin inside the injection gate opening and the cylindrical molded body by raising the knock-out pin, and

removing the cylindrical article from the core by pushing the bottom portion of the cylindrical molded body.

6. The method set forth in claim 3, wherein the insert is fitted, attached and held in a cylindrical shape along the inner surface of the outer mold unit in the molding cavity by applying a contact frictional force between the core and the insert, said contact frictional force formed by placing the insert into the outer mold unit while the core of the injection molding mold is pulled out from the outer mold unit and the molding cavity is opened, and forwardly moving the core into the outer mold unit.

7-11. (Canceled)

12. The method set forth in claim 4, wherein a knock-out pin is provided in the core, said method further comprising:

upwardly pulling out the pull-out mold unit of the outer core mold unit after the injection molding,

cutting a connection between the cured resin inside the injection gate opening and the cylindrical molded body by raising the knock-out pin, and

removing the cylindrical article from the core by pushing the bottom portion of the gate cylindrical molded body.

13. The method set forth in claim 4, wherein the insert is fitted, attached and held in a cylindrical shape along the inner surface of the outer mold unit in the molding cavity by applying a contact frictional force between the core and the insert, said contact frictional force formed by placing the insert in the cylindrical shape into the outer mold unit while the core of the injection molding mold is pulled out from the outer mold unit and the molding cavity is opened, and forwardly moving the core into the outer mold unit.

14. The method set forth in claim 5, wherein the insert is fitted, attached and held in a cylindrical shape along the inner surface of the outer mold unit in the molding cavity by applying a contact frictional force between the core and the insert, said contact frictional force formed by placing the insert in the cylindrical shape into the outer mold unit while the core of

the injection molding mold is pulled out from the outer mold unit and the molding cavity is opened, and forwardly moving the core into the outer mold unit.

15-20. (Canceled)

21. The insertion-molded cylindrical article of claim 1, wherein:

said insert includes an inner face bonded to said barrel portion and an outer face opposite to said inner face; and

said outer face is substantially free of a material forming said article.

22. The insertion-molded cylindrical article of claim 1, wherein said mark is positioned only at said inner surface of the cylindrical molded body while being inwardly apart from said upper end of said insert in an axial direction and only at a position corresponding to a position on said inner surface that is covered by said insert.

23. The method set forth in claim 3, comprising injecting said molten resin through said injection gate opening toward said molded body inner surface only at a position inwardly apart from said upper end of the insert in an axial direction and only at a position corresponding to a position on said molded body inner surface that is covered by said insert.

EVIDENCE APPENDIX

NONE

RELATED PROCEEDINGS APPENDIX

NONE

OTHER SUBMISSION APPENDIX

Manual Translation of Japanese Patent Application Laid-Open No. 6246777 to Suzuki et al.

(English Translation)

Japanese Patent Application Laid-open No. 246777-1994

(54)[Title of the Invention] Apparatus for manufacturing composite containers

(57)[Abstract]

[Purpose] To provide an apparatus for manufacturing a composite container, capable of manufacturing a composite container provided with a part protruding toward the outside of the container, such as an opening portion with a screw.

[Construction] A split mold is provided at a portion corresponding to a part protruding toward the outside of a composite container in the container of a fixed side template, and a cavity formed between the fixed side template and a core comprises a space formed between a split mode and the core and a space formed between the fixed side template and the core.

[Claim(s)]

[Claim 1] An apparatus for manufacturing a composite container by arranging a blank plate in a cavity formed between a fixed side template and a core and injecting a thermoplastic resin in the cavity,

wherein the fixed side template comprises a split mold at a portion corresponding to a part protruding toward the outside of the composite container in the container, and the cavity comprises a space formed between the split mold and the core and a space formed between the fixed template and the core.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] The present invention relates to an apparatus for manufacturing a composite container in which a blank plate and a thermoplastic resin are integrally molded, and more particularly to a manufacturing apparatus capable of manufacturing a composite container provided with a part protruding toward the outside of the container.

[0002]

[Prior Art] A composite container in which a blank plate and thermoplastic resin are integrally molded, which is a so-called pillared container has been conventionally used.

[0003] Generally, the pillared container is a composite container in which a blank plate formed of a laminated sheet material in which paper and a resin are laminated is arranged in a cylindrical shape in an injection molding metal mold and the blank plate is integrally molded in a state where it is held in a container shape by a holding frame made of resin by injecting a thermoplastic resin to a joined part where end portions of the blank plate are butt-welded, an opening end, and others. Further a resin layer of an innermost surface of this blank plate is integrated by being thermo-fused with the injected thermoplastic resin, thereby increasing the strength of the molded container.

[0004] Such a pillared container has both an advantage as an injection molded product and an advantage as a paper container, and is widely used as a container which holds various products such as soft drinks, refined sake, a powder detergent, an aromatic, liquefied foods and others.

[0005]

[Problem(s) to be Solved by the Invention] However, a container which has an opening portion with a screw and a cap with a pump attached at this opening portion like a container of a shampoo or liquid soap has a problem that this container cannot be manufactured by using a composite container like a pillared container. That is, since a part protruding toward the container outside like the opening with a screw exists, the container is hard to be taken out from an injection molding metal mold when removing the container from the injection molding metal mold after the blank plate and the resin are integrated by injecting the thermoplastic resin. For this reason, the above-described container having the opening portion with a screw has been conventionally manufactured by blow molding.

[0006] In view of the above-described problem, it is an object of the present invention

to provide a composite container manufacturing apparatus capable of manufacturing a composite container including a part protruding toward the outside of the container like an opening portion with a screw.

[0007]

[Means for Solving the Problem] In order to achieve this object, according to the present invention, there is provided an apparatus for manufacturing a composite container by arranging a blank plate in a cavity formed between a fixed side template and a core and injecting a thermoplastic resin in the cavity, wherein the fixed side template comprises a split mold at a portion corresponding to a part protruding toward the outside of the container in the composite container, and the cavity comprises a space formed between the split mold and the core and a space formed between the fixed side template and the core.

[0008]

[Effects] The thermoplastic resin injected into the cavity formed between the fixed side template and the core is integrated with the blank plate previously arranged in the cavity in order to form the composite container, the part protruding toward the container outside in this composite container is placed in the cavity formed between the split mold and the core, the engagement established between the composite container and the fixed side template is released by opening the split mold so that the composite container can be taken out together with core from the fixed side template.

[0009]

[Embodiment] An embodiment according to the present invention will now be described hereinafter with reference to the accompanying drawings. FIG. 1 is a schematic cross-sectional view showing an example of an apparatus for manufacturing a composite container according to the present invention. In FIG. 1, a manufacturing apparatus 1 according to the present invention comprises a fixed side attaching plate 11 provided with an injection gate 41, a fixed side template 12 which can be coupled

with/separated from the fixed side attaching plate 11, split molds 21a and 21b each of which is provided above the fixed side template 12 (the fixed side attaching plate 11 side) and equipped with a groove portion for forming a thread, a core 31 arranged in a movable side attaching plate 34 through a backing plate 35, and a stripper plate 36 arranged to a guide pin 42.

[0010] Further, an angular pin 13 protrudes on the fixed side attaching plate 11 toward a slanting lower part so that it may separate from the core 31, and a guide member 14 is arranged on the outer side. The angular pin 13 pierces the split mold 21a and reaches the inside of a concave portion 15 formed to the fixed side template 12. Furthermore, the guide member 14 includes a surface 14a having an inclination corresponding to a tilt angle of the angular pin 13 on the split mold 21a side. Moreover, a surface of the split mold 21a in a direction opposite to the split mold 21b constitutes a surface having an inclination corresponding to a tilt angle of the angular pin 13, and this surface is in contact with the surface 14a of the guide member. Additionally, a biasing member 16 is provided in an accommodation hole portion 17 formed from the fixed side attaching plate 11 to the fixed side template 12. With such a configuration, when the fixed side attaching plate 11 is separated from the fixed side template 12 and the split molds 21a and 21b by the biasing member 16, the split mold 21a can slide on a circumferential surface of the angular pin 13 and the surface 14a of the guide member and move in a direction apart from the core 31 (a right-hand direction in the illustrated example).

[0011] On the other hand, a plurality of runners 32 which connect the injection gate 41 with a later-described cavity 51 are drilled in the upper portion of the core 31. Further, an ejection pin 33 is provided at a substantially central part of the core 31 so as to be capable of moving up and down, and a flange portion 33a is provided to a lower portion of the ejection pin 33. Furthermore, the flange portion 33a is slidably positioned in a cylinder portion 35a formed in the backing plate 35, and the cylinder portion 35a is linked with the outside through a communication hole 35b. Moreover,

the cylinder portion 35a is also coupled with a communication hole 34a formed in a movable side attaching plate 34. Additionally, the cylinder portion 35a is air-tightly divided into the communication hole 35b side and the communication hole 34a side by the flange portion 33a. Therefore, when air or the like is supplied into the cylinder portion 35a from the outside through the communication hole 34a, the flange portion 33a moves up in the cylinder 35a, and the ejection pin 33 thereby protrudes upwards from the upper plane of the core 31.

[0012] The illustrated example shows a state where the fixed side attaching plate 11 is in contact with the fixed side template 12 and the split molds 21a and 21b and the core 31 is inserted into the fixed side template 12. In this state, a cavity 51 is formed at a gap portion between the core 31 and the fixed side template 12 and the split molds 21a and 21b, and a fused thermoplastic resin can be injected into the cavity 51 from the injection gate 41 through the runners 32.

[0013] A description will now be given as to an example of the composite container which can be formed by using the above-described manufacturing apparatus 1 according to the present invention with reference to FIGS. 2 and 3. FIG. 2 is a perspective view showing an example of the composite container, and FIG. 3 is a cross-sectional view of the composite container depicted in FIG. 2 taken along a line III-III. In FIGS. 2 and 3, the composite container 100 is a so-called a pillared container comprising: a main body 101 consisting of a thermoplastic resin molding portion 102 and a blank plate 103 which is held in a cylindrical shape; and a bottom portion 111.

[0014] The thermoplastic resin molding portion 102 of the main body 101 comprises a pillar portion 102a molded at a spliced portion where end portions 103a and 103b of the blank plate 103 are butt-welded, a flange portion 102b molded at an opening end 103b at the lower opening end portion of the blank plate 103 which is held in the cylindrical shape, a shoulder portion 102c formed at an opening end 103c at the upper portion of the blank plate 103, and an opening portion with a screw thread 102d protruding at a

substantially central part of this shoulder portion 102c. Furthermore, for example, a cap such as a cap with a pump (indicated by an imaginary line in FIG. 1) is screwed on the opening portion with a screw thread 102d so that the inside of the composite container 100 is sealed.

[0015] Such a main body 101 comprising the thermoplastic resin molding portion 102 and the blank plate 103 can be manufactured by the above-described manufacturing apparatus. Here, the blank plate has, e.g., a three-layer structure of polyethylene (PE)/paper/polyethylene (PE), a five-layer structure of polypropylene (PP)/PE/paper/PE/polypropylene (PP), or a five-layer structure of PE/paper/adhesive layer/aluminum (Al) layer/PE.

[0016] Moreover, the bottom portion 111 comprises a flange portion 112 formed of a thermoplastic resin around the bland plate 113 for the bottom portion, and is separately formed from the main body 101. Additionally, the bottom portion 111 is integrated with the main body 102 when the flange portion 112 is secured to the inner peripheral surface of the flange portion 102b of the main body 101. As to securing of the flange portion 102b and the inner peripheral surface of the flange portion 112, screw portions may be formed to the both members so that they are screwed together, or the both members may be joined each other by using various methods such as heat-sealing method or an ultrasonic sealing method.

[0017] It is to be noted that the ultrasonic sealing method can be used as means for integrating the flange portion 102b of the main body 101 with the bottom portion 111, and a convex portion can be provided on a lower end surface of the flange portion 102b of the main body 101 in this case. Such a convex portion is selectively fused by ultrasonic waves, thereby rapidly and assuredly performing heat-sealing. Additionally, an L-shaped edge portion may be provided to an outer rim portion of the flange portion 102b like the illustrated example in order to prevent the fused resin from flowing to the outside from a space between the flange portion 102b and the bottom portion 111. The

convex portion can take any shape such as a ring shape or a protruding shape like a circular cone, and it is preferable to set a height of the convex portion in a rage of 0.1 to 0.5 mm and set an angle of an apex in a range of 60 to 120°. Further, the convex portion may be provided on the flange portion 112 side of the bottom portion 111, and the lower end surface of the flange portion 102b has a flat shape in this case.

[0018] An operation of the manufacturing apparatus for the composite container according to the present invention will now be described taking production of the main body 101 of the above-described composite container 100 as an example. First, as shown in FIG. 4, the blank plate 103 which has been wound around the core 31 and thereby kinked in advance is arranged at a predetermined position of the cavity 51. Then, the fused thermoplastic resin is injected into the cavity 51 from the injection gate 41 through the runners 32 as shown in FIG. 5. As a result, the pillar portion 102a, the flange portion 102b, the shoulder portion 102c and the opening portion with a screw thread 102d are molded and, at this moment, the blank plate 103 held in the cylindrical shape is fused and integrated with the thermoplastic resin constituting the pillar portion 102a, the flange portion 102b and the shoulder portion 102c at the end portions 103a and 103a, the lower opening end 103b and the upper opening end 103c.

[0019] Incidentally, it is preferable that existence of the pillar portion 102a formed by injection of the thermoplastic resin is hard to be confirmed from the outside of the composite container 100 in view of the exterior appearance, and hence a quantity of resin forming the pillar portion 102a may be reduced as much as possible, for example. Additionally, as shown in FIG. 3, a rib 105 may be provided in such a manner that it protrudes on the container inner side of the pillar portion 102a. By providing the rib 105 in the protruding manner, stacking between the respective main bodies can be avoided and the subsequent separation can be facilitated when the main bodies 101 before integration with the bottom portions 111 are stored or carried in a piled state.

[0020] Then, as shown in FIG. 6, engagement between the fixed side attaching plate

11 and the fixed side template 12 which are engaged and in contact with each other by a non-illustrated engagement member is released, and the fixed side attaching plate 11 is separated from the fixed side template 12 and the split molds 21a and 21b by the biasing member 16. At this moment, since the angular pin 13 relatively moves upward together with the fixed side attaching plate 11 with respect to the split mold 21a, the split mold 21a slides on the circumferential surface of the angular pin 13 and the surface 14a of the guide member and moves in a direction apart from the core 31 (a right-hand direction in the illustrated example). It is to be noted that, although not shown, the same mechanism as that of the split mold 21a is also provided to the split mold 21b, and the split mold 21b also moves in the direction apart from the core 31 simultaneously with movement of the split mold 21a. Therefore, engagement between the opening portion with a screw thread 102d and the split molds 21a and 21b is released. As a result, as shown in FIG. 7, the core 31 can be readily pulled out from the fixed side template 12 together with the main body 101 of the composite container having the opening portion with a screw thread 102d. At this time, the stripper plate 36 is separated from the fixed side template 12 integrally with the core 31.

[0021] After the core 31 is pulled out to a predetermined position from the fixed side template 12, air is supplied into the communication hole 34a from an external compressed air supply device (not shown) as shown in FIG. 8 so that the flange portion 33a positioned at the lower portion in the cylinder 35a can be moved up in the cylinder 35a. As a result, the ejection pin 33 moves up in the core 31 and protrudes upwards from the upper plane of the core 31, thereby eliminating the thermoplastic resin 61 remaining in the core 31 and the runners 32.

[0022] At last, as shown in FIG. 9, the stripper plate 36 is moved up along the core 31 with the guide pin 42 being used as a guide, and the main body 101 of the molded composite container is taken out from the core 31.

[0023] It is to be noted that the runners 32 are drilled at the upper portion of the core

31 in the above-described example of the manufacturing apparatus 1, but the manufacturing apparatus according to the present invention is not restricted thereto, and the runners 32 may not be drilled.

[0024] Further, since it is preferable that existence of the pillar portion 102a formed by injection of the thermoplastic resin is hard to be confirmed from the outside of the composite container 100 in view of the external appearance, it is preferable to design the core 31 in such a manner that a quantity of resin forming the pillar portion 102a can be reduced as much as possible. Furthermore, as shown in FIG. 3, the rib 105 may be provided so as to protrude on the container inner side of the pillar portion 102a. By forming the rib 105 in the protruding manner, stacking between the main bodies can be avoided and subsequent separation can be facilitated when the main bodies 101 before integration with the bottom portions 111 are stored or carried in the piled manner.

[0025] Moreover, in the present invention, such a concave portion 31a as shown in FIG. 10(A) may be provided to the outer peripheral portion of the core 31 corresponding to a position where the flange portion 102b of the main body 101 of the composite container is formed. In this case, as shown in FIG. 10(B), when the thermoplastic resin is injected in a state that the blank plate 103 is arranged in the cavity 51, the flange portion 102b is formed, and the thermoplastic resin is also filled in the concave portion 31a. Additionally, as shown in FIG. 7, when removing the core 31 from the fixed side template 12, the main body 101 of the composite container is engaged with the core 31 in the concave portion 31a, thereby assuredly removing the main body 101 of the composite container together with the core 31 from the fixed side template 12. The main body 101 of the composite container 100 shown in FIG. 3 is molded by using such a core.

[0026]

[Effect(s) of the Invention] As described above, according to the present invention, since the composite container formed by injecting the thermoplastic resin into the cavity

formed between the fixed side template and the core and integrating the thermoplastic resin with the blank plate can be pulled out from the core when the split molds placed at a part protruding toward the outside of the container are opened, the composite container can be readily taken out together with the core from the fixed side template, and a container including a protruding part like an opening portion with a screw which cannot be produced unless blow molding is used can be manufactured in the form of the composite container.

[Brief Description of the Drawings]

[FIG. 1] FIG. 1 is a schematic cross-sectional view showing an example of an apparatus for manufacturing a composite container according to the present invention.

[FIG. 2] FIG. 2 is a perspective view showing an example of a composite container.

[FIG. 3] FIG. 3 is a cross-sectional view of the composite container depicted in FIG. 2 taken along a line III-III.

[FIG. 4] FIG. 4 is a perspective view showing an example of a blank plate used for the composite container.

[FIG. 5] FIG. 5 is a view showing a state in which a fused thermoplastic resin is injected into a cavity in which the blank plate is arranged in advance.

[FIG. 6] FIG. 6 is a view showing a state in which a fixed side attaching plate is separated from a fixed side template and split molds are opened.

[FIG. 7] FIG. 7 is a view showing a state in which a core is pulled out together with a main body of the composite container from the fixed side template.

[FIG. 8] FIG. 8 is a view showing a state in which compressed air is supplied into an air cylinder and the thermoplastic resin remaining in the core and runners is eliminated.

[FIG. 9] FIG. 9 is a view showing a state in which a stripper plate is moved up along the core and the main body of the molded composite container is removed from the core.

[FIGS. 10] FIGS. 10 are partially enlarged cross-sectional views of the core of the apparatus for manufacturing a composite container according to the present invention,

in which FIG. 10(A) is a view showing a state before injection molding and FIG. 10(B) is a view showing a state where the blank plate is arranged in the cavity and the thermoplastic resin is injected.

[Reference Numerals]

1 ... apparatus for manufacturing a composite container

11 ... fixed side-attaching plate

12 ... fixed side template

21a, 21b ... split molds

31 ... core

33 ... ejection pin

51 ... cavity

100 ... composite container

103 ... blank plate